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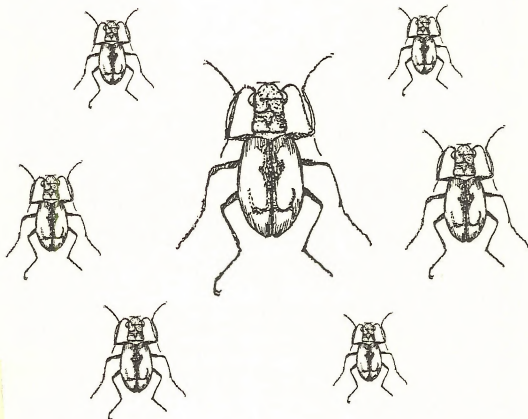
BURLEY DISTRICT

TIGER BEETLE INVENTORY



by

Paul D. Makela



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TIGER BEETLE INVENTORY

by

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Snake River Resource Area
Burley, ID

March 25, 1994

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	ii
INTRODUCTION.....	1
STUDY AREA.....	5
METHODS.....	5
RESULTS.....	8
DISCUSSION AND MANAGEMENT RECOMMENDATIONS.....	16
LITERATURE CITED.....	21

FIGURES

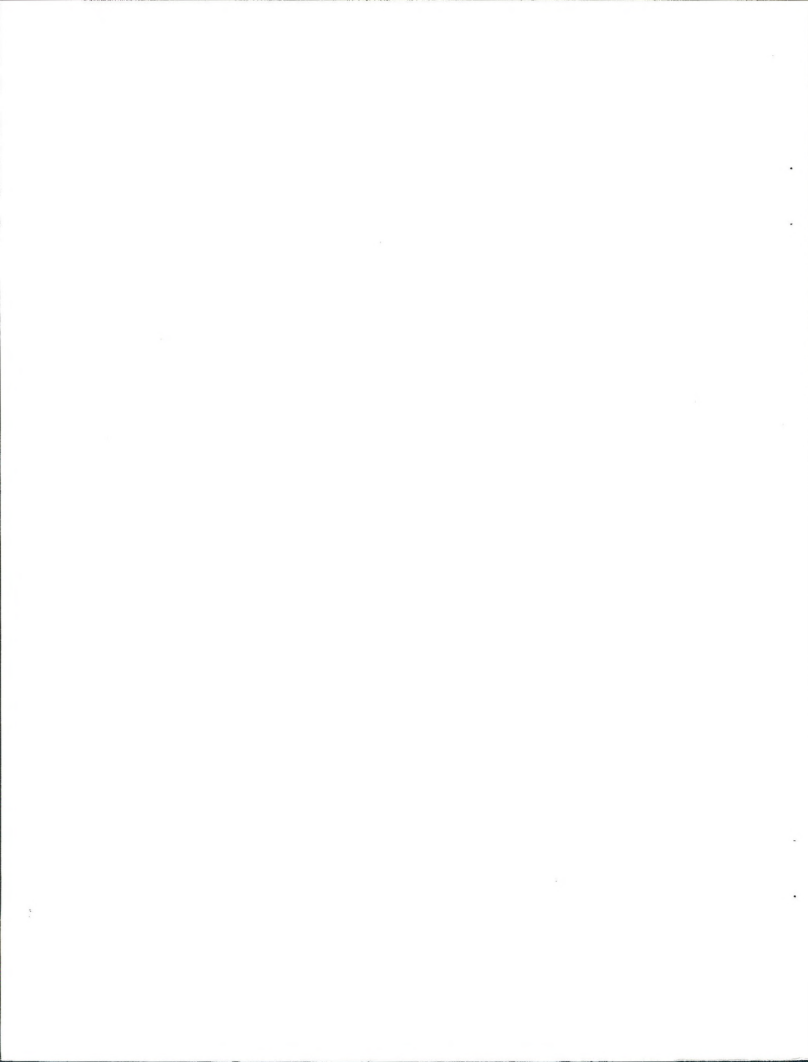
Figure 1. BLM Districts and historic locations of Idaho dunes tiger beetles.	2
Figure 2. Study area for 1992-1993 Idaho dunes tiger beetle surveys.	6
Figure 3. Idaho dunes tiger beetle locations and associated grazing allotments on the Burley District.	11

TABLES

Table 1. Burley District Idaho dunes tiger beetle survey results: 1992.	9
Table 2. Burley District Idaho dunes tiger beetle survey results: 1993.	10

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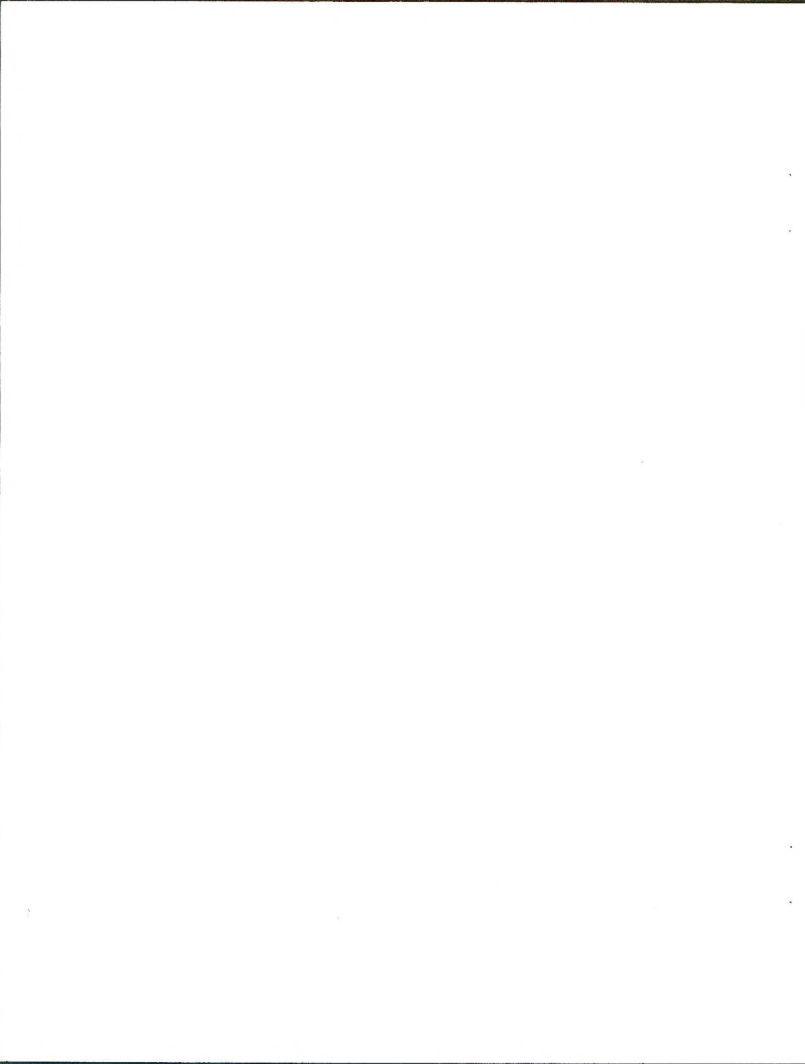


INTRODUCTION

The first known collection of Idaho dunes tiger beetles (Cicindela arenicola Rumpp) was made at St. Anthony Dunes, Fremont County, Idaho, on June 13, 1963, by William F. Barr and students from the University of Idaho (Shook and Clark 1988). The beetle was formally described as a distinct species by Norman L. Rumpp in 1967 (Rumpp 1967). Subsequent surveys documented the species as occurring on the Bruneau Dunes, Owyhee County and on the Keyburn Dunes, Minidoka County (Figure 1).

It has been suggested by V. Clifford, of Graham, Washington, that the Bruneau Dunes/Owyhee County population is a distinct subspecies but Anderson (1989) contends that the hypothesis is unjustified. It is possible, if not likely, that specimens of Idaho dunes tiger beetles in populations between St. Anthony and Bruneau will show a mix or variations of the trait or traits which are supposedly unique to the Bruneau population (R. C. Anderson, ISU, personal communication, February 11, 1994). Anderson recognizes three biotypes of Idaho dunes tiger beetle: a green/metallic green variant to the west (Bruneau Dunes/Owyhee County), a brownish-tan variant to the east (St. Anthony Dunes population), and a coppery variant mixed with a green variant in Power, Bannock, and Bonneville Counties.

Concern over the population status and stability of the Idaho dunes tiger beetle was raised in the late 1970's (Shook and Clark 1988). Surveys at St. Anthony Dunes in the late 1970's



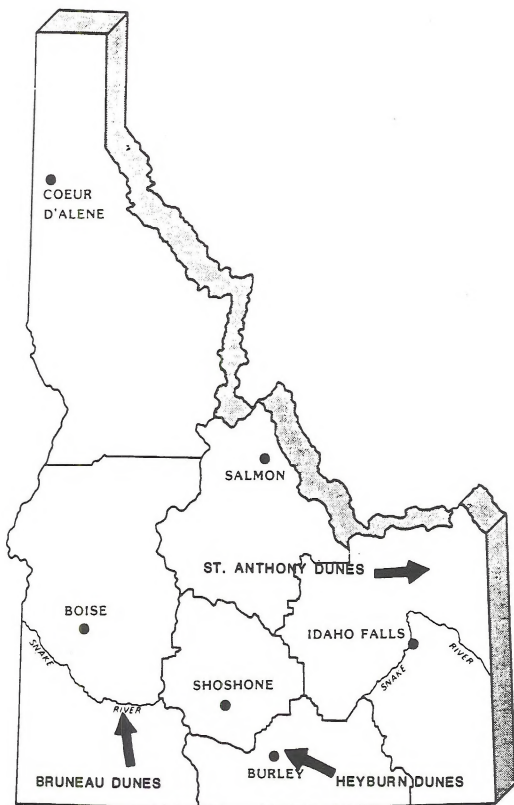
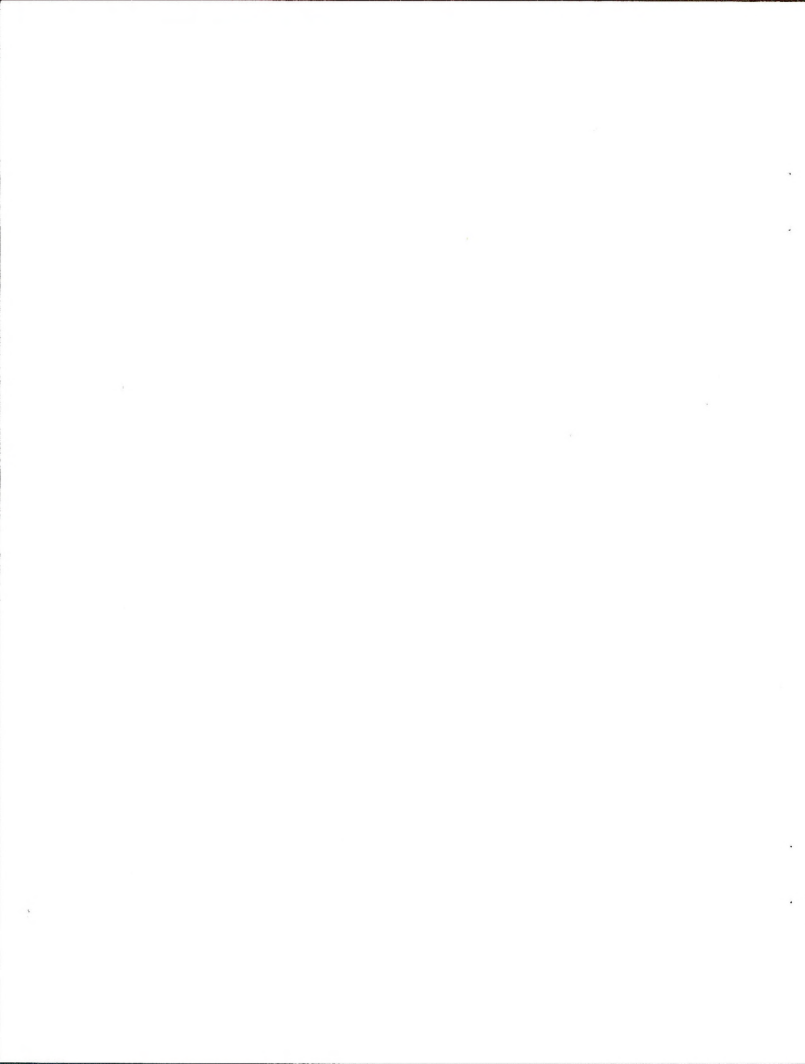


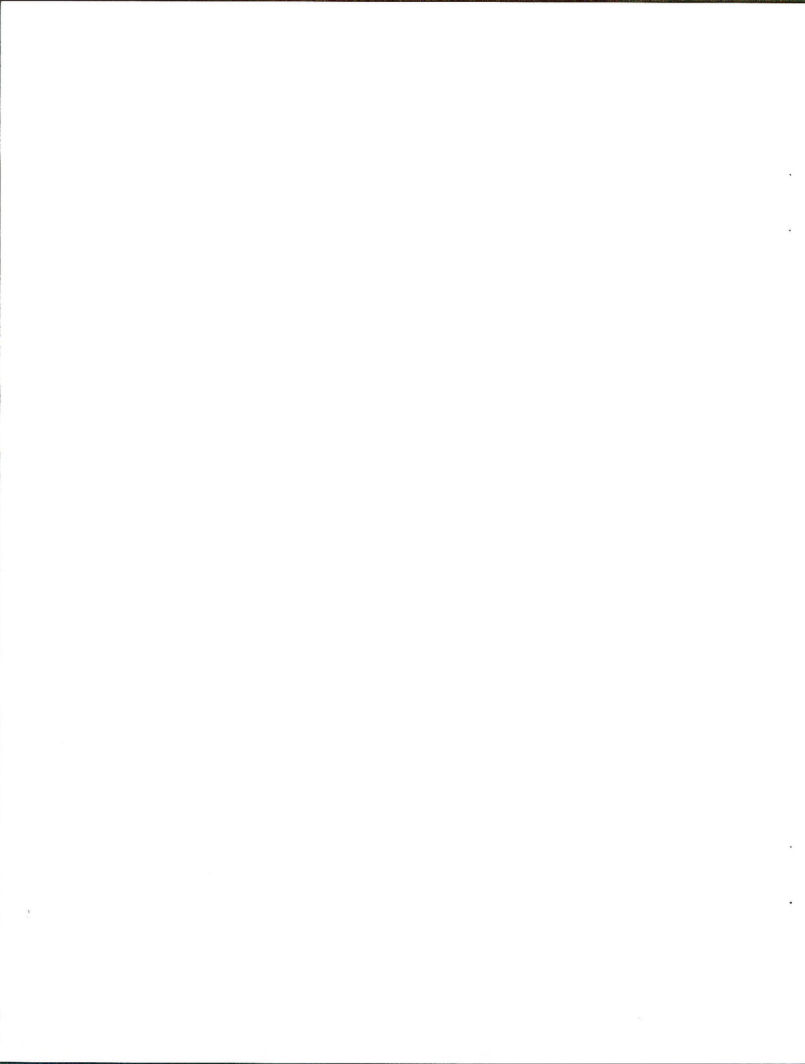
Figure 1. Bureau of Land Management districts and historic locations of Idaho dunes tiger beetles.



resulted in concern over the potential impacts of Off-Road Vehicle (ORV) use on beetles and beetle habitat (Jay Shepherd, U.S. Fish and Wildlife Service, Division of Endangered Species, personal communication, December 1993). In 1984, the Idaho dunes tiger beetle was classified as a federal candidate (Category C2) for Threatened or Endangered status (Federal Register 1984).

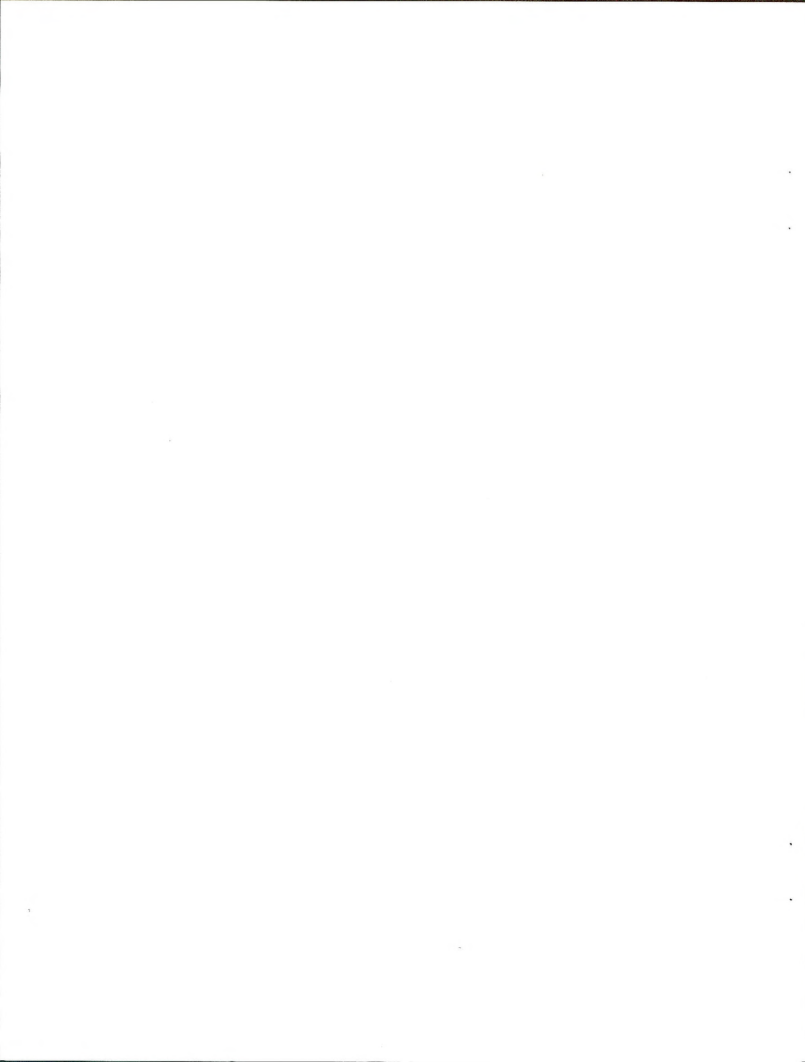
Tiger beetle numbers apparently are greater in eastern Idaho and much less so in the west, where they may be moving toward extinction (Anderson 1989). Baker et al. (1994) also found much lower densities for the Bruneau tiger beetle populations than did Anderson in his surveys in eastern Idaho. Dunes tiger beetle populations on the Burley District in southcentral Idaho are probably of relatively low densities as well, based on preliminary surveys (this document). At least one population in the Burley area has been lost to human activity. No beetles were found during surveys of the Heyburn Dunes in 1982, 1985, and 1986, (Shook and Clark 1988) nor have any been found in recent years (Anderson 1989).

Despite the apparent relative scarcity of Idaho dunes tiger beetles in western and southcentral Idaho, recent studies indicate that the species is more widespread than initial surveys of the 1960's and 1970's suggested. Anderson (1989), in a study sponsored by the Bureau of Land Management's (BLM) Idaho Falls



District, reported that the St. Anthony population also occupies dunes in Jefferson and Clark Counties. Anderson (1989) also reported that the species occurs on some isolated dunes in Bonneville County, and may occur in Bannock County. Surveys in conjunction with a graduate research study at Idaho State University documented the presence of dunes tiger beetles in Power County (Anderson 1989; Bauer 1989). Baker et al. (1994) documented a previously unknown population of beetles 8.1 miles (13 km) east of Bruneau Dunes State Park in Owyhee County.

Interest in a more detailed distribution analysis of the Idaho dunes tiger beetle on the Burley District arose in 1991 as a result of concerns over possible impacts of cattle and ORV activity described by Bauer (1991). Since Bauer's study area occurred near the eastern border of the Burley District, the possibility existed that tiger beetles could also occur on sand dunes further west. Thus, grazing allotments potentially containing sand dunes were identified by Snake River Resource Area staff and surveyed for the presence of dunes tiger beetles during late spring-early summer 1992 and 1993. Adult Idaho dunes tiger beetles were documented in a number of locations on or immediately adjacent to six grazing allotments across portions of Blaine, Minidoka, and Power Counties, Idaho.

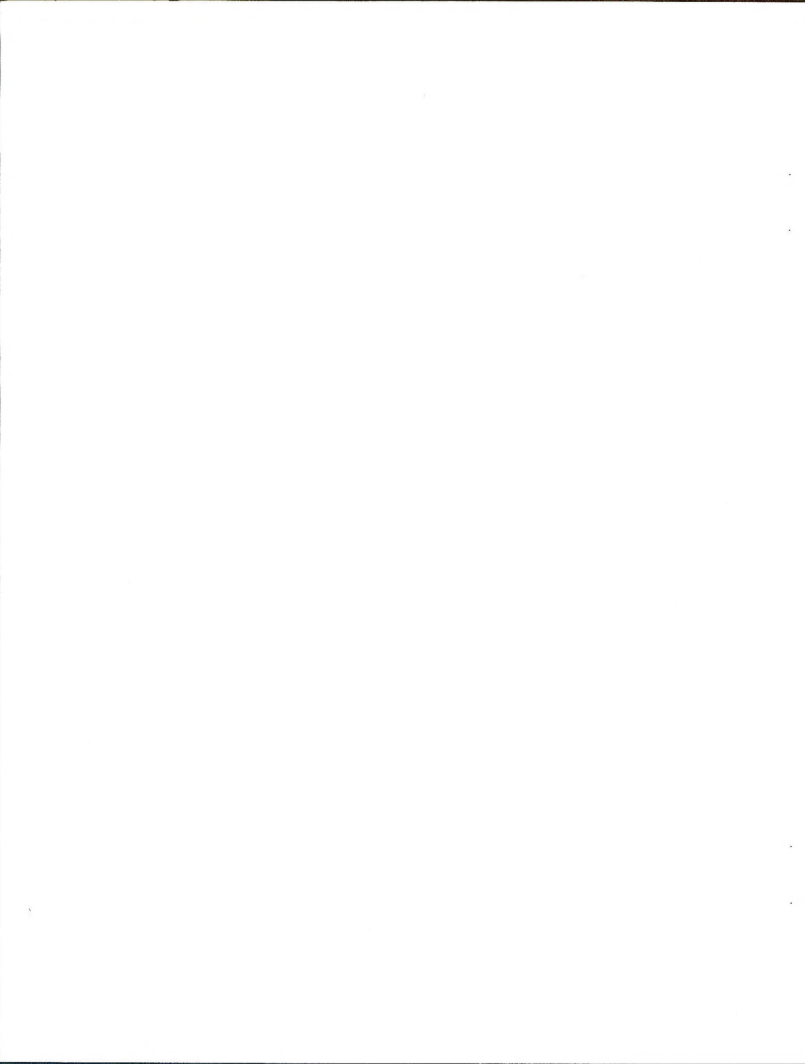


STUDY AREA

Surveys in 1992 and 1993 were conducted in that portion of the Burley District north of the Snake River and West of American Falls, Idaho (Figure 2). Counties represented included Blaine, Minidoka, Power, and Jerome. Grazing allotments having some potential for presence of sand dune habitats, based on local expertise and/or aerial photographs, included the Cedar Fields, Bench, Lake Channel, Railroad, Walcott, Dune, Sand, Wilson, Borah, Ponderosa, Schodde, and Eagle Rock allotments. Suitable dunes likely occur on the latter two allotments, but these were not surveyed due to access limitations and/or lack of time. Individual sand dunes examined in the course of the study varied greatly in size from portions of an acre to over 50 acres, although certain dune complexes (series of small dunes within a sagebrush/grass matrix) covered several square miles.

METHODS

In April 1992, Dr. Robert C. Anderson, Idaho State University entomologist, conducted a field seminar for Burley District staff on identification of and field survey techniques for Idaho dunes tiger beetles. Representative sand dunes within the study area were then surveyed for presence or absence of the species by District staff in May and June of 1992 and 1993. One visit was made in early July 1993.



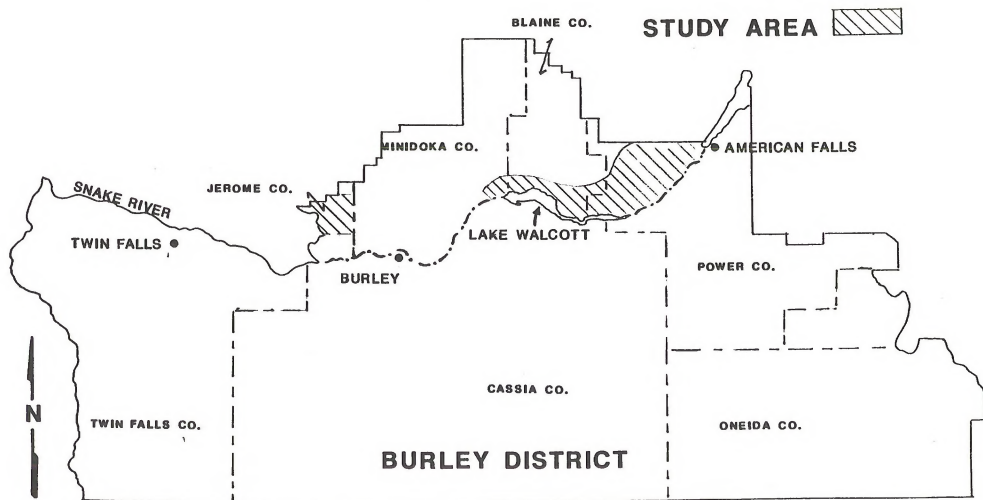
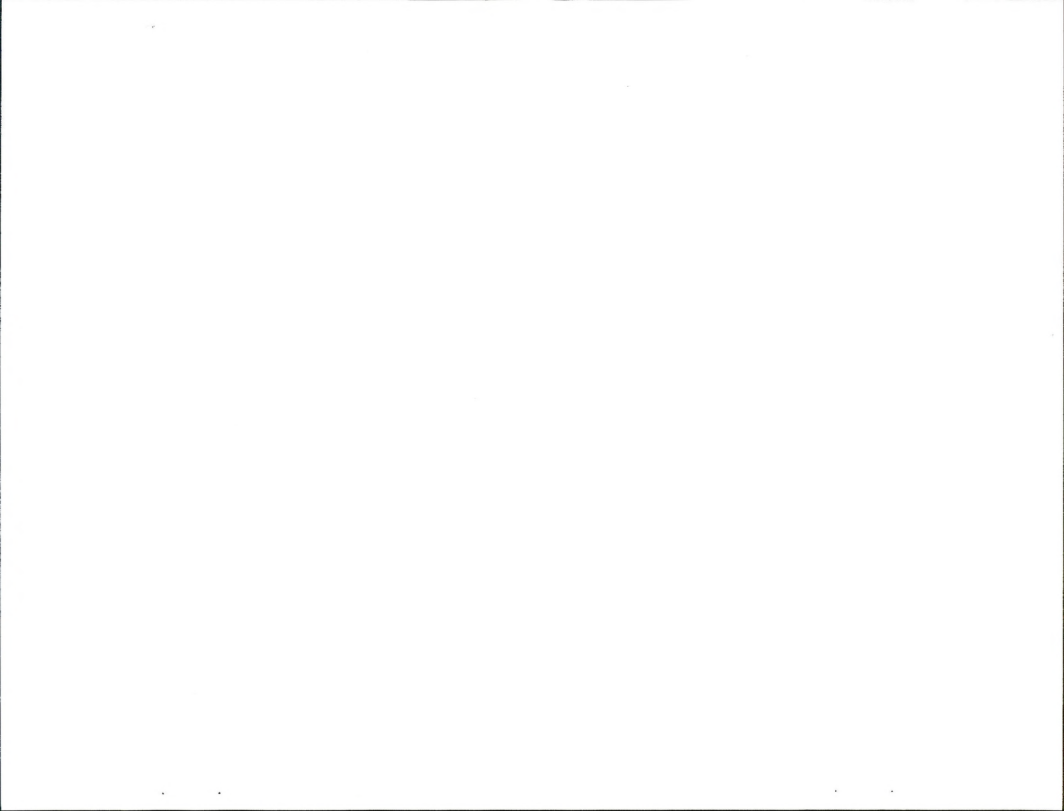
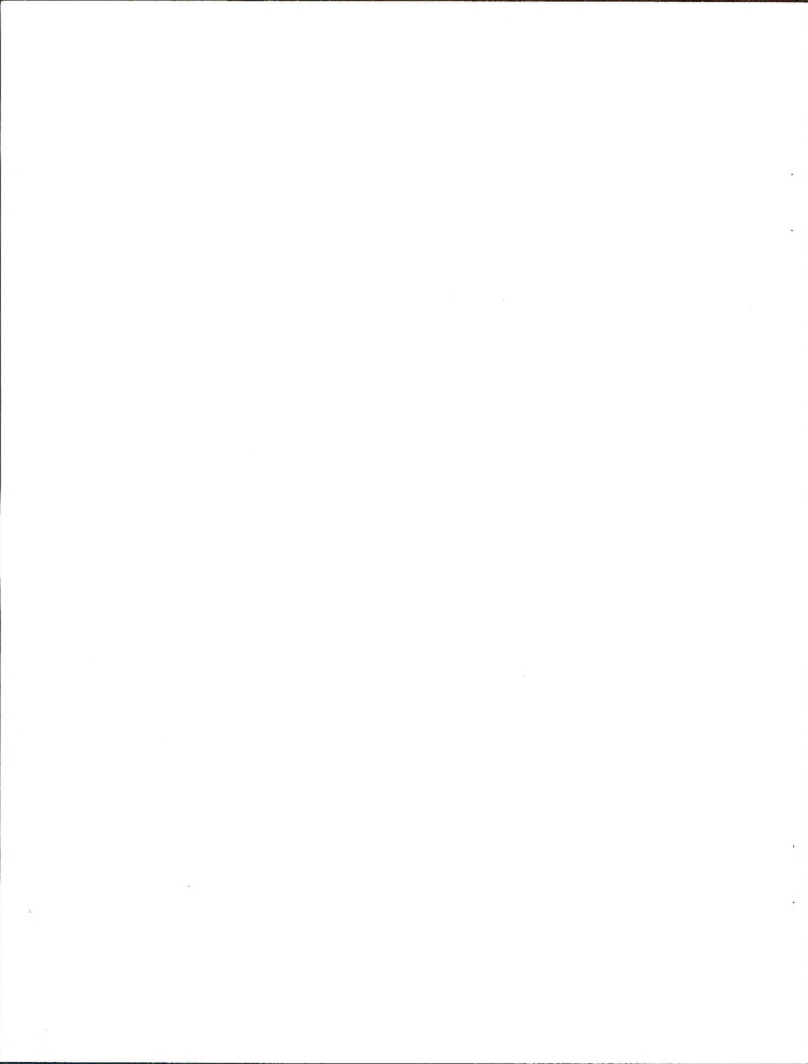


Figure 2. Study area for 1992-1993 Idaho dunes tiger beetle surveys.



An attempt was made initially to estimate beetle densities by counting adult beetles within a series of fixed-radius plots, however this method proved unacceptably time consuming on many small sand dunes possibly due to low beetle densities. Systematically walking dunes and dune complexes while visually scanning for beetles often resulted in the observation of one or more individuals within 20-30 minutes. Documenting presence or absence allowed field staff to cover a much larger area in the limited time allotted. Specific sand dunes or dune complexes may be studied more intensively later as the need arises.

In general, an effort was made to conduct beetle surveys in late spring and early summer during morning hours on days with minimal cloud cover and relatively calm winds. However, virtually continuous winds on the Snake River Plain at times necessitated conducting surveys in less-than-ideal conditions. As temperature or winds increase, adult Idaho dunes tiger beetles seek shade or burrow into the sand, hindering their observation; similarly, adult beetles are largely inactive on cool, cloudy days, and may not venture out of their burrows (Bauer 1989; R. C. Anderson, ISU, personal communication, April 1992). Fine nylon mesh butterfly nets were used to capture and identify dunes tiger beetles during the first survey attempts; thereafter, it was possible to identify them visually, without the need for capture. After consultation with the USFWS Boise Field Station, eleven



individual beetles were collected across the study area and preserved for future reference. The collection is maintained at the Burley District office, U.S. Bureau of Land Management. Beetle locations were plotted on 1:100,000 surface management maps and on 1:24,000 topographic maps. A report detailing specific beetle locations was submitted each year to the Idaho Conservation Data Center (ICDC). Probable dunes tiger beetle larval burrows were also noted where encountered but were not considered definitive in reports to the ICDC due to the possibility of erroneously identifying a burrow's occupant.

RESULTS

The presence of adult Idaho dunes tiger beetles was documented on or near six of ten grazing allotments surveyed in 1992 and 1993 (Tables 1 and 2). No sand dunes or beetles were found on the Ponderosa, Borah or Wilson allotments. Allotments within which adult tiger beetles were documented included the Cedar Fields, Bench, Lake Channel, Walcott, and Dune allotments (Figure 3.). Beetles very likely occur on the Railroad allotment due to an abundance of suitable habitat, but were documented just outside the south boundary in 1993. No beetles were observed on the Sand allotment, but their occurrence is likely because of the presence of dunes. Due to time limitations, field staff were not able to survey the Eagle Rock and Schodde allotments, however beetles probably occur on each, particularly the former, based on

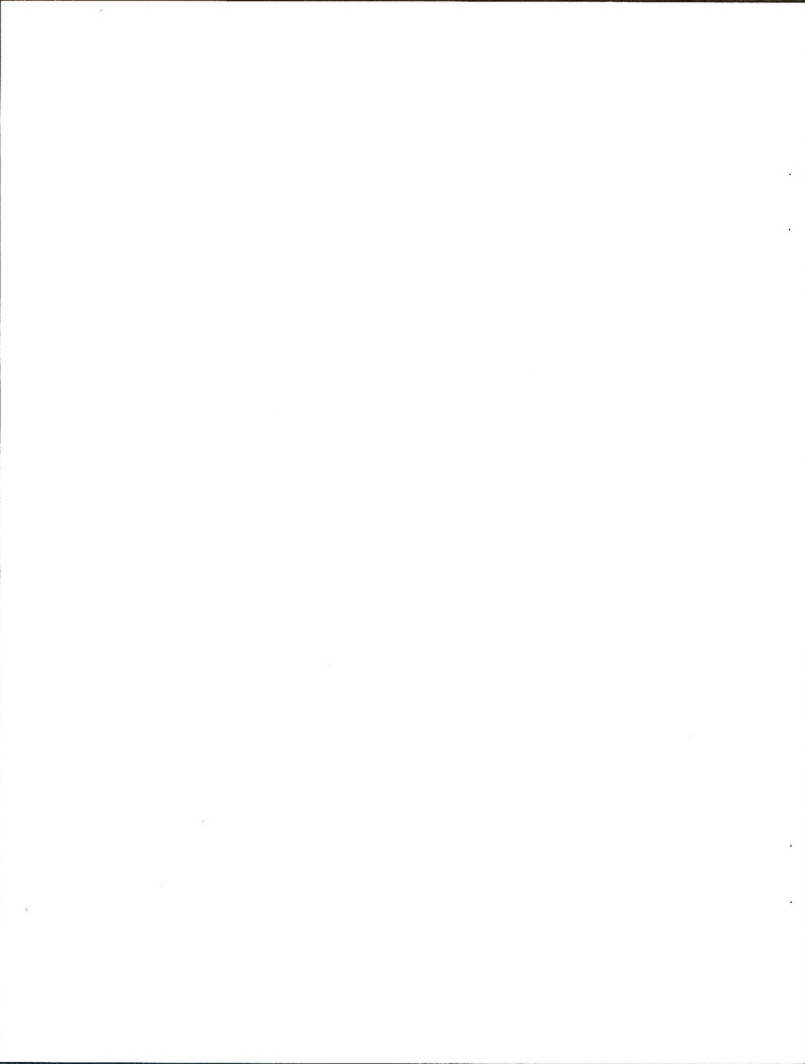


Table 1. Burley District Idaho dunes tiger beetle survey results: 1992.

No.	County	Allotment	Legal Description	Adults	Burrows	Date	Remarks
92-01	Minidoka	Walcott	T08S R25E: Sec 35 NW1/4NW1/4	4	5	05/04/92	PSLA on dunes; 30 min.; Makela, Green
92-02	Minidoka	Walcott	T08S R25E: Sec 26 SW1/4SW1/4	1	7	05/04/92	ELFL on dunes; ORV use; Makela, Green
92-03	Blaine	Walcott	T08S R26E: Sec 23 NW1/4SW1/4	2	0	05/04/92	ELFL, PSLA, AGCR on dunes; Makela, Green Dune stabilization area; West of road.
92-04	Blaine	Walcott	T08S R26E: Sec 23 NW1/4SW1/4	1	0	05/04/92	ELFL on dune; Makela, Green; East of road
92-05	Minidoka	Walcott	T08S R25E: Sec 27 SW1/4NE1/4	2	N/A	05/06/92	AGCR, ARTR, Chrysothamnus on dunes; Makela, Tharp, Green
92-06	Minidoka	Walcott	T08S R25E: Sec 24 SW1/4SE1/4	1	8	05/06/92	PSLA, ELFL, SASP on dunes; Makela, Gall, Tharp
92-07	Minidoka	Walcott	T08S R25E: Sec 25 SW1/4SE1/4	0	8	05/06/92	ORHY, ARTR, SASP, Chrysothamnus on dunes; Makela, Tharp, Gall; ORV activity on dune; 45 minutes
92-08	Pover	Dune	T08S R29E: Sec 04 NW1/4NE1/4	2	4	05/12/92	ORHY, ELFL, Rumex on dunes; Makela
92-09	Pover	Dune	T08S R29E: Sec 03 NW1/4NW1/4	0	1	05/12/92	ELFL on dunes; Makela
92-10	Pover	Lake Channel	T08S R29E: Sec 20 NE1/4SE1/4	7	4	05/12/92	ELFL on dune; Makela; 60 minutes; Large Dune > 50 acres

LEGEND TO PLANT ABBREVIATIONS: ORHY, Oryzopsis hymenoides, Indian ricegrass; PSLA, Psoralea lanceolata, lemon scurf-pea; ELFL, Elymus flavescens, yellow wild-rye; AGCR, Agropyron cristatum, crested wheatgrass; ARTR, Artemisia tridentata, big sagebrush; SASP, Salsola spp., Russian thistle.

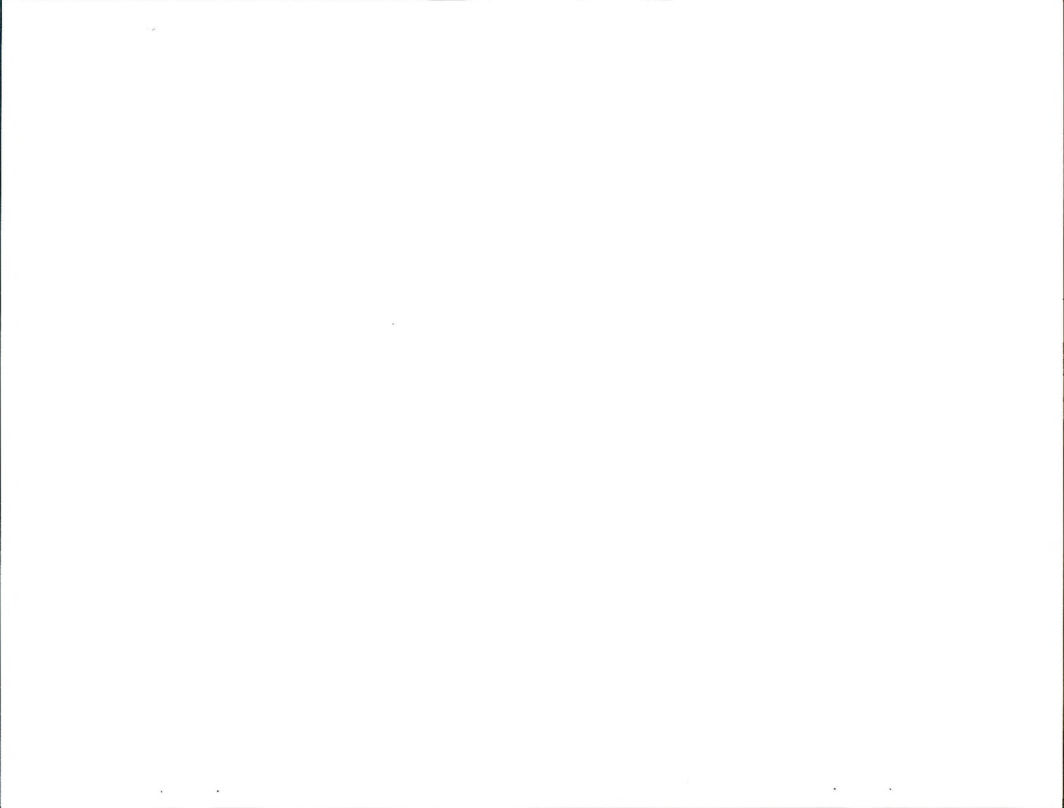


Table 2. Burley District Idaho dunes tiger beetle survey results: 1993.

No.	County	Allotment	Legal Description	Adults	Burrows	Date	Remarks
93-01	Pover	Cedar Fields	T09S R29E: Sec 03 NENW1/4	4	N/A	05/12/93	ELFL on dune; 30 minutes; Makela, Tharp
93-02	Pover	Cedar Fields	T09S R29E: Sec 10 NENW1/4	4	N/A	05/12/93	ELFL on dune; 4 minutes; Makela, Tharp
93-03	Pover	Bench	T09S R29E: Sec 07 NENW1/4	4	Many	05/12/93	ELFL on dune; 25 minutes; Makela
93-04	Pover	Lake Channel	T09S R29E: Sec 07 SW1/4	1	5	05/20/93	PSLA on dune; 5 minutes; Makela
93-05	Pover	Lake Channel	T09S R29E: Sec 07 NENW1/4	0	5	05/20/93	PSLA on dune; 15 minutes; Makela
93-06	Pover	Railroad	T08S R30E: Sec 05 NW1/4	2	0	07/06/93	ELFL on dune; 20 minutes; Makela, Augsburg; Very large dune complex north of railroad tracks; several square miles.
N/A	Pover	Sand	T08S R29E: Sec 12 E1/2	0	0	07/06/93	ELFL, PSLA on dune; 20 min.; Makela, Augsburg
N/A	Jerome	Wilson	T09S R21E	N/A	N/A	05/17/93	No suitable dunes located; Makela, Tharp
N/A	Pover	Borah	T08S R30E: Sec 1, 11, 12	N/A	N/A	06/24/93	No suitable dunes located; Makela, Hayden
N/A	Pover	Ponderosa	T09S R29E: Sec 17, 18	N/A	N/A	05/20/93	Silt dunes noted, no sand; Makela
N/A	Pover	Eagle Rock	T08S R30E: Sec 29, 20	N/A	N/A	05/17/93	Beetles probable; access restricted; Makela
N/A	Blaine	Schodde	T09S R27E	N/A	N/A	N/A	Not surveyed; Dunes possible; Makela

LEGEND TO PLANT ABBREVIATIONS: PSLA, Psoralea lanceolata, lemon scurf-pea; ELFL, Elymus flavescens, yellow wild-rye.

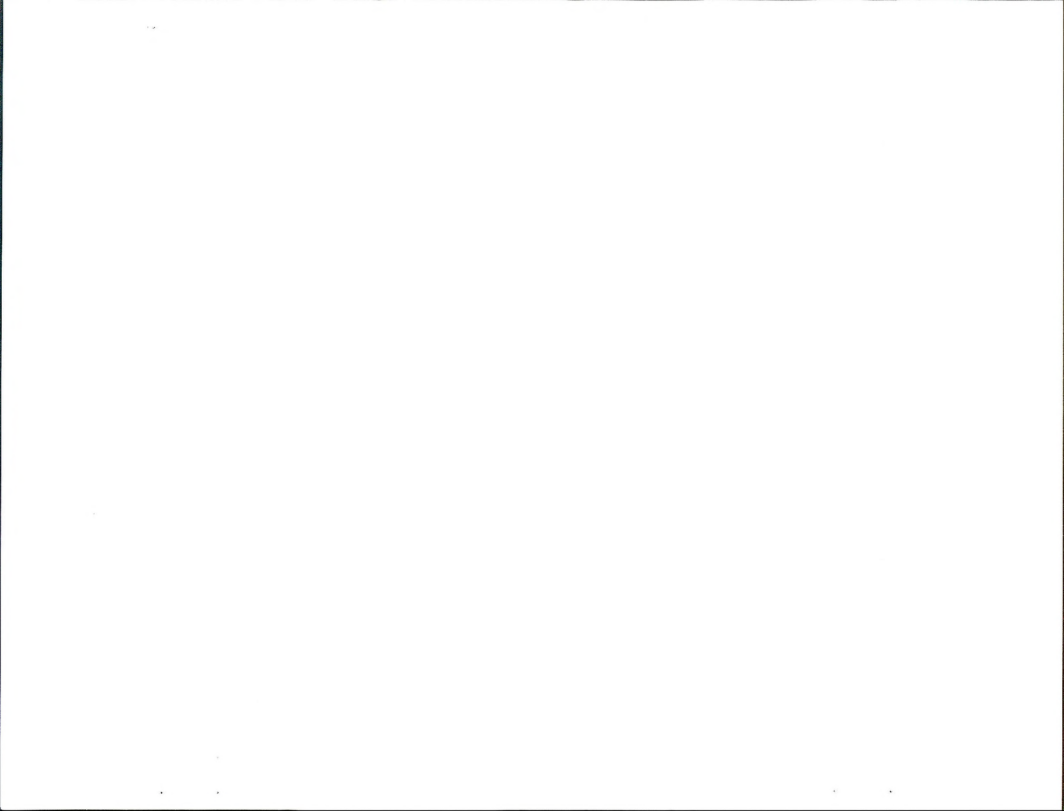
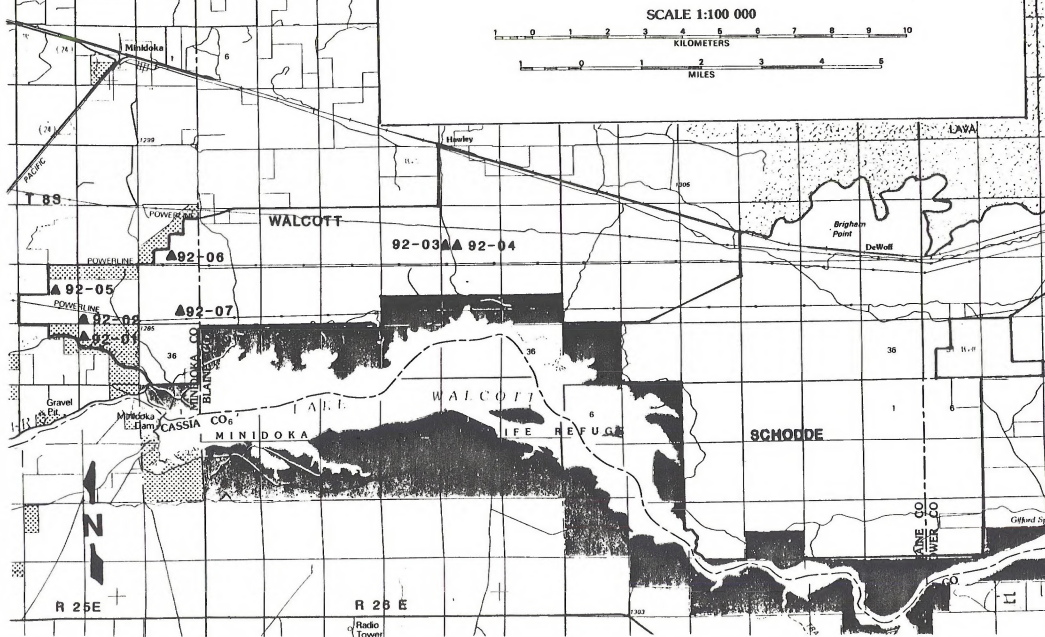
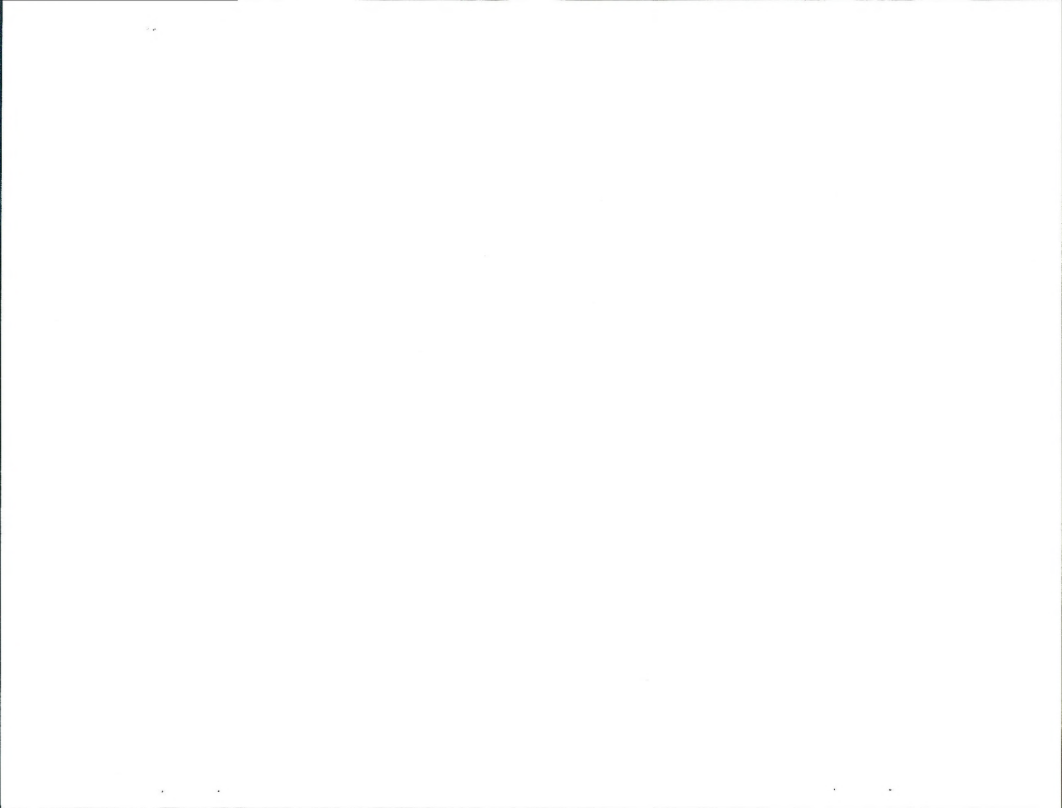


Figure 3. Idaho dunes tiger beetle locations and associated grazing allotments on the Burley District, U.S. Bureau of Land Management. As of 1992 and 1993 field surveys.





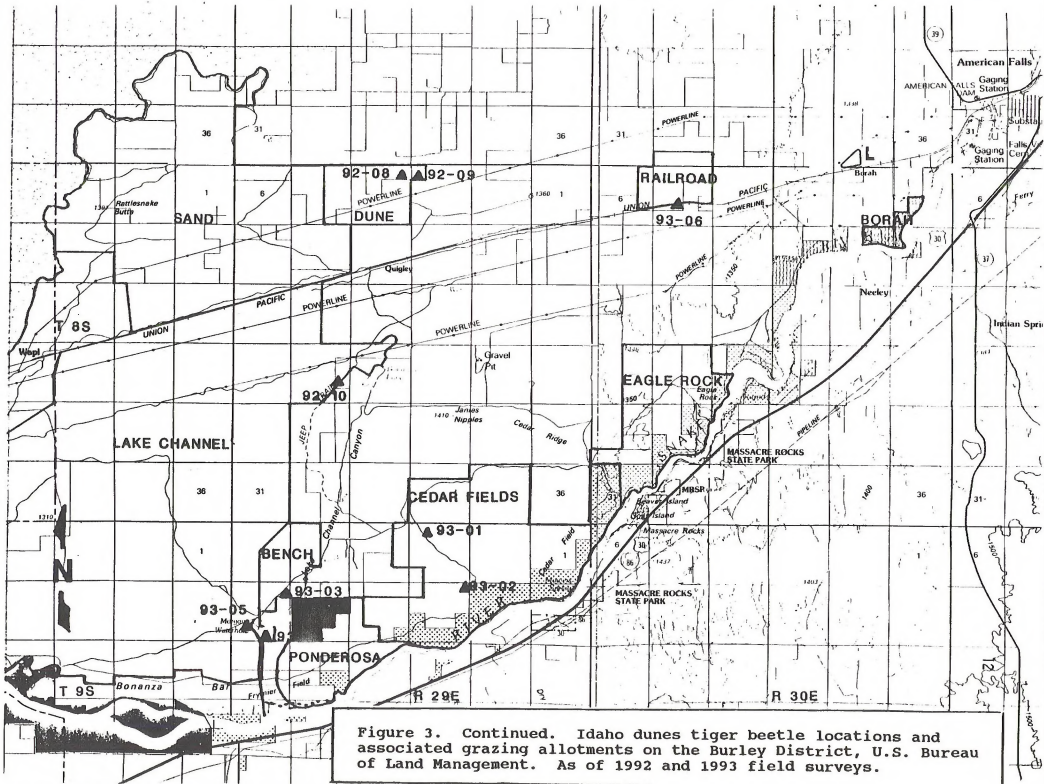


Figure 3. Continued. Idaho dunes tiger beetle locations and associated grazing allotments on the Burley District, U.S. Bureau of Land Management. As of 1992 and 1993 field surveys.

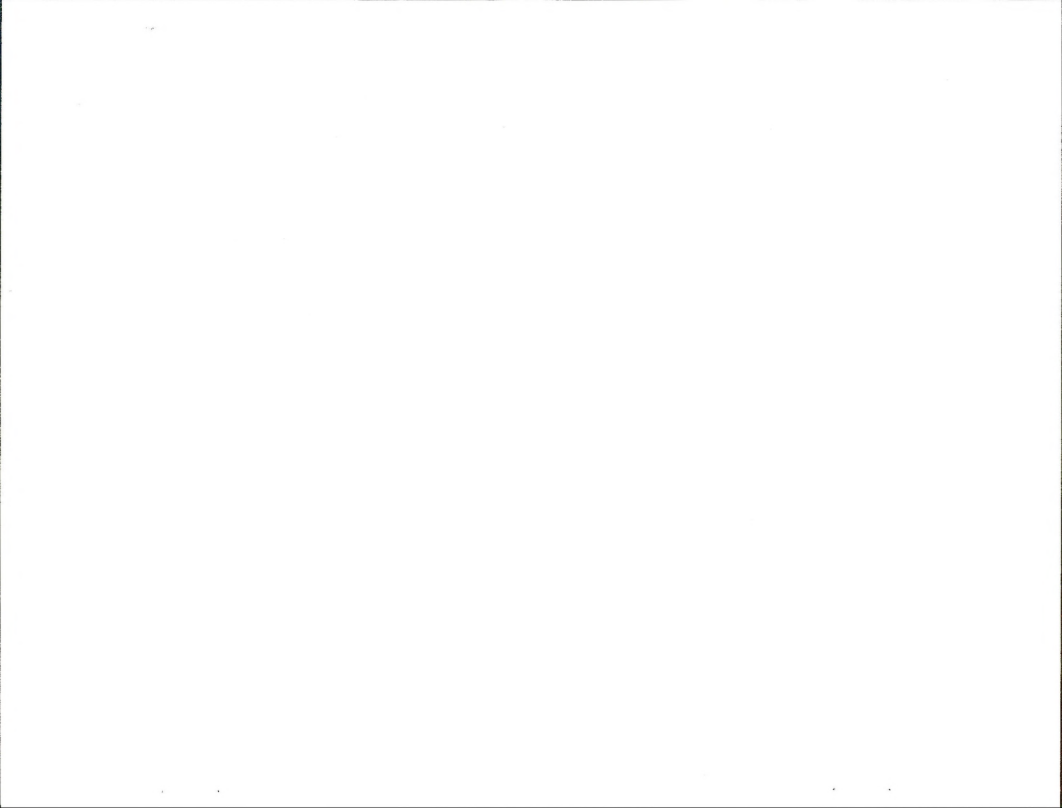
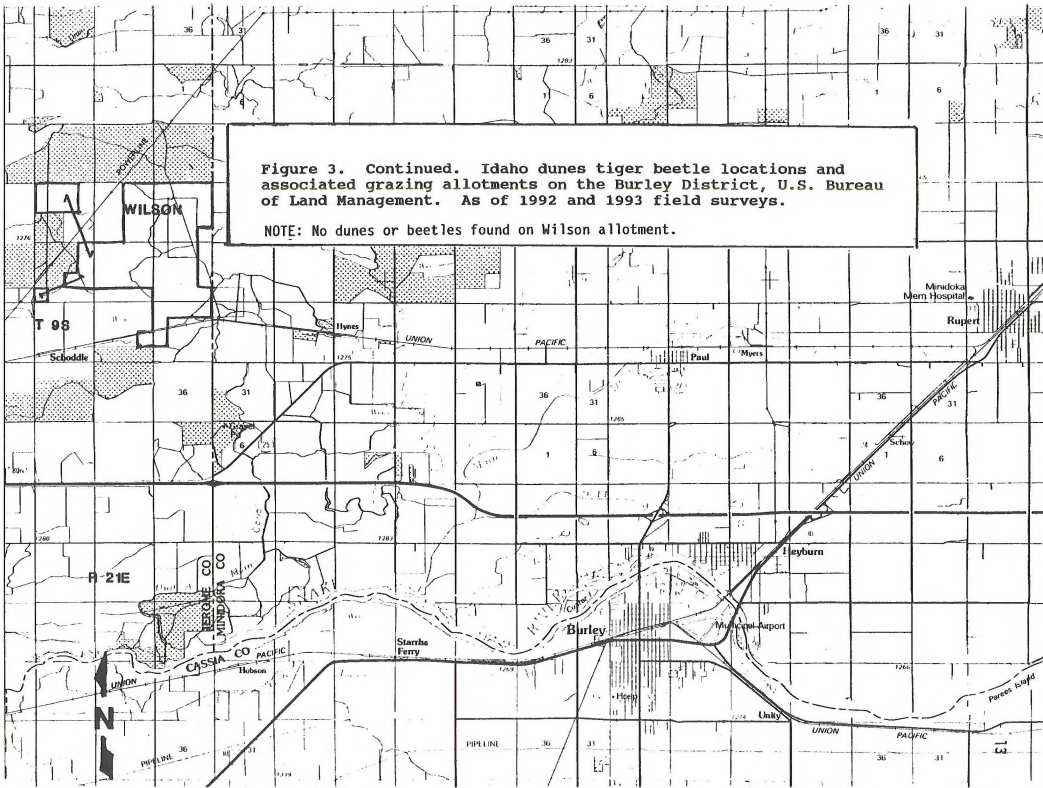
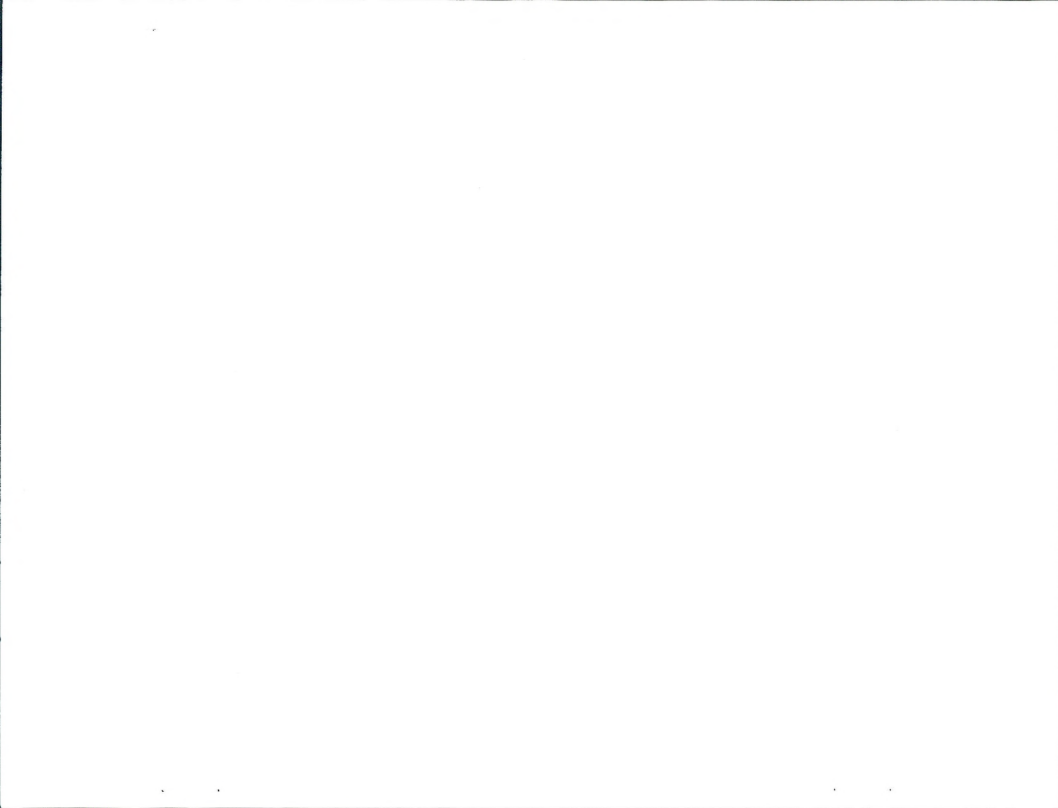


Figure 3. Continued. Idaho dunes tiger beetle locations and associated grazing allotments on the Burley District, U.S. Bureau of Land Management. As of 1992 and 1993 field surveys.

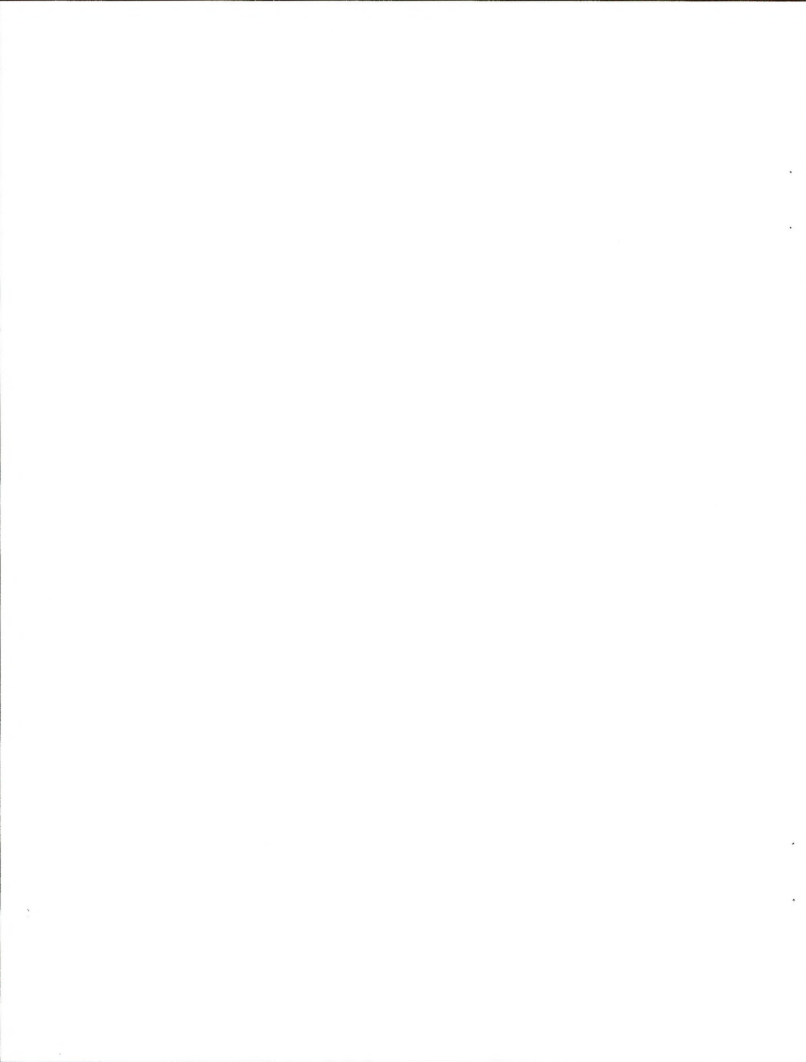
NOTE: No dunes or beetles found on Wilson allotment.





the presence of sand dunes visible on 1987 color aerial imagery. Beetle surveys are planned for these two allotments in 1994.

The most extensive beetle-occupied dune complexes within the Burley District boundary occur within a band roughly two miles north and south of the Union Pacific Railroad, and extending perhaps 10-15 miles west-southwest from American Falls. Many of these dunes occur on private land, but also comprise much of the BLM-administered Railroad and Dune allotments, portions of the Lake Channel and Sand allotments, as well as three isolated BLM parcels. A large individual dune, over 50 acres in size and potentially harboring a sizeable population of dunes tiger beetles, lies on the east edge of the Lake Channel allotment, about 0.5 miles west of Bonanza Lake (Figure 3, Beetle Location 92-10). Several other notable, though smaller, dunes or dune complexes occur on the Bench, Eagle Rock and Cedar Fields allotments, near the north shore of the Snake River and up to two miles inland. Moving westward, aerial photographs also suggest that dunes are generally small and very widely scattered on the Schodde allotment. Of note also are several dunes, worthy of further study, which lie within the Minidoka National Wildlife Refuge boundary (Marti Collins, USFWS, personal communication). The western-most sand dunes and documented beetle locations noted thus far within the Burley District occur in Minidoka County within the west portion of the Walcott allotment, two to three



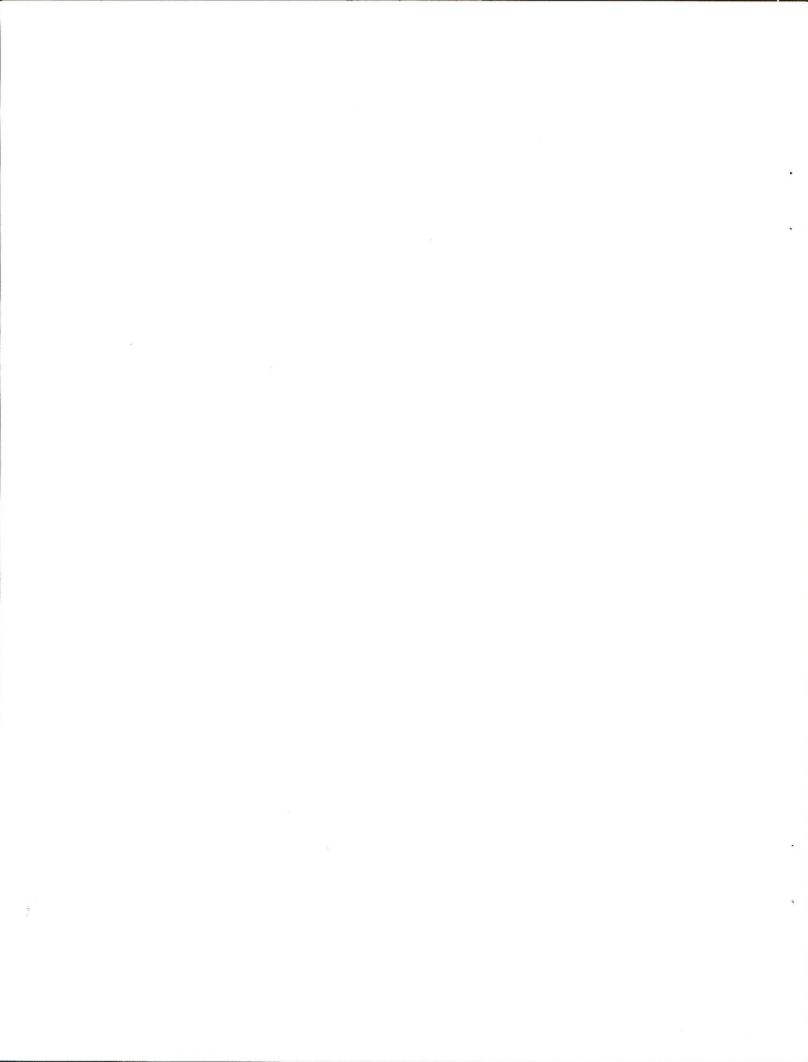
miles north and northwest of Minidoka Dam.

All Idaho dunes tiger beetles observed in this study exhibited a predominantly metallic green color, similar to Anderson's (1989) description for the Bruneau Dunes populations to the west. No brownish-tan or coppery biotypes, characteristic of the St. Anthony and Power-Bonneville County biotypes (Anderson 1989) were observed. It appears that Power County may be the point at which the copper and green biotypes intermingle, as Anderson (1988) reported that both variants occurred there. There is probably little likelihood of genetic interchange between the Burley District beetle populations and the Bruneau populations, due to a lack of connectivity of suitable habitat. Anderson (1989) reported that dispersal occurs at a rate of perhaps one-half mile in two months in a step-wise manner between dunes, and that it is unlikely that adults disperse more than 0.75 miles from their original dune/habitat unit. Vast areas of unsuitable habitat between the Burley District populations and the Bruneau populations thus render such interchange unlikely. A study comparing the genetics of the Bruneau, Burley District, and St. Anthony populations would be revealing and could help alleviate the current uncertainty surrounding the species' taxonomy.

Due to the qualitative nature of the surveys, no effort was made to perform statistical analyses on the beetle or vegetal data. Nonetheless, it was possible to make some generalizations about dune habitats. Tiger beetle observations were strongly linked to active sand dunes sparsely vegetated with yellow wild rye (Elymus flavescens), lemon scurf-pea (Psoralea lanceolata), and/or Rumex venosus. This is consistent with habitat descriptions by Anderson (1989) and Bauer (1989). Vegetation surrounding dunes included Wyoming big sagebrush (Artemisia tridentata wyomingensis), Sandberg's bluegrass (Poa sandbergii), cheatgrass (Bromus tectorum), crested wheatgrass (Agropyron cristatum), and rabbitbrush (Chrysothamnus spp.)

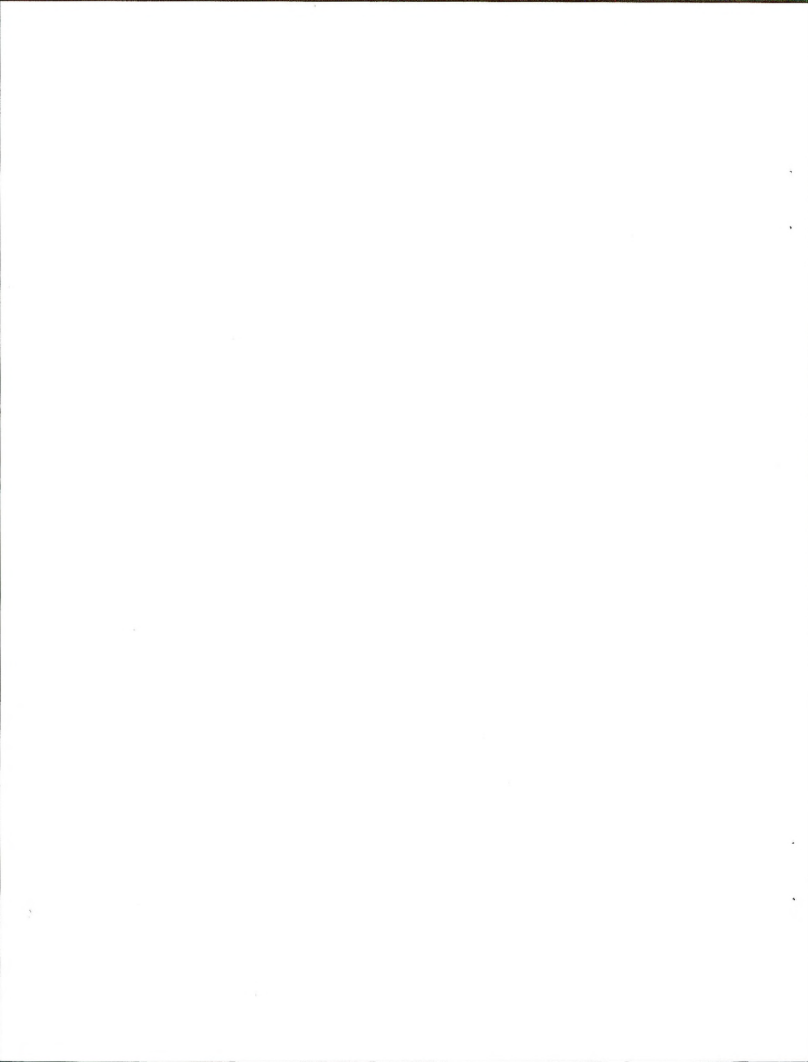
DISCUSSION AND MANAGEMENT RECOMMENDATIONS

In 1992 and 1993, adult Idaho dunes tiger beetles were observed in thirteen locations in Minidoka, Blaine, and Power Counties, Idaho. Occurrences of the species in Blaine County have not been previously documented, based on Idaho Conservation Data Center records. In Blaine county, dunes are typically small and widely scattered. Sand dune occurrence and probably beetle densities are greatest in the eastern portion of the study area in Power County. Beetle locations documented in Minidoka County are thus far the western-most in the Burley District, and are situated approximately two miles northwest of Minidoka Dam.



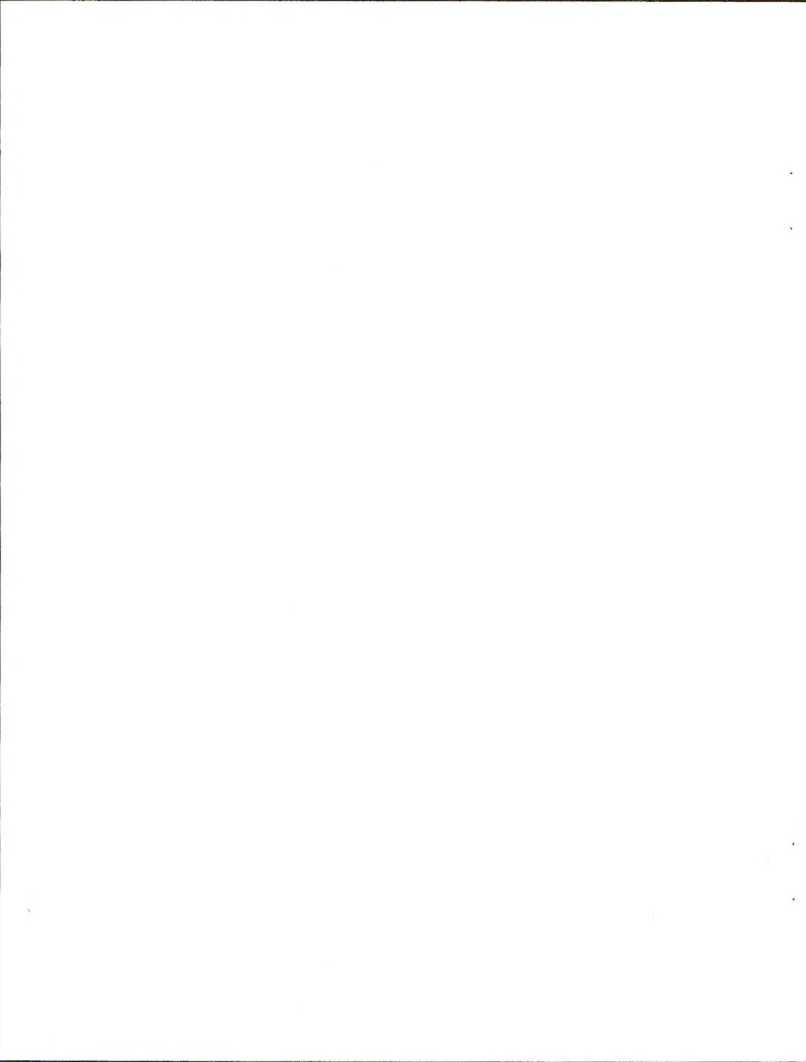
The assertion by Shook and Clark (1988) that the Idaho dunes tiger beetle "should be placed on the Rare and Endangered list before it is gone" may be premature albeit worthy of consideration. Indeed, a formal status review of the species has never been done, although Anderson (1989) surveyed "all known potential habitat sites in Idaho" during 1988 and 1989 to assess the species' status and distribution. For years, the only documented occurrences of Idaho dunes tiger beetles reported in the literature suggested that the species was limited to the Bruneau, Heyburn, and St. Anthony Dunes. Recent findings (Anderson 1988, 1989; Baker et al. 1994; Bauer 1989, 1991; Makela, this document) indicate that the species is not strictly limited to these dunes, and apparently is more extensive in distribution than once believed.

Certain populations of Idaho dunes tiger beetles, if not the species as a whole, may nonetheless warrant consideration for Endangered Species Act protection. The isolated Heyburn Dunes population near Burley was lost evidently due to human disturbance (Anderson 1989). No beetles have been observed at the Weiser Dunes or Halverson Lake Dunes in western Idaho, possibly due to heavy ORV activity and ready access (Shook and Clark 1988). Anderson (1989) predicted that the Bruneau Dunes population may become extinct "within 5 years", because of intensive, unregulated collecting of beetles. Baker et al.,



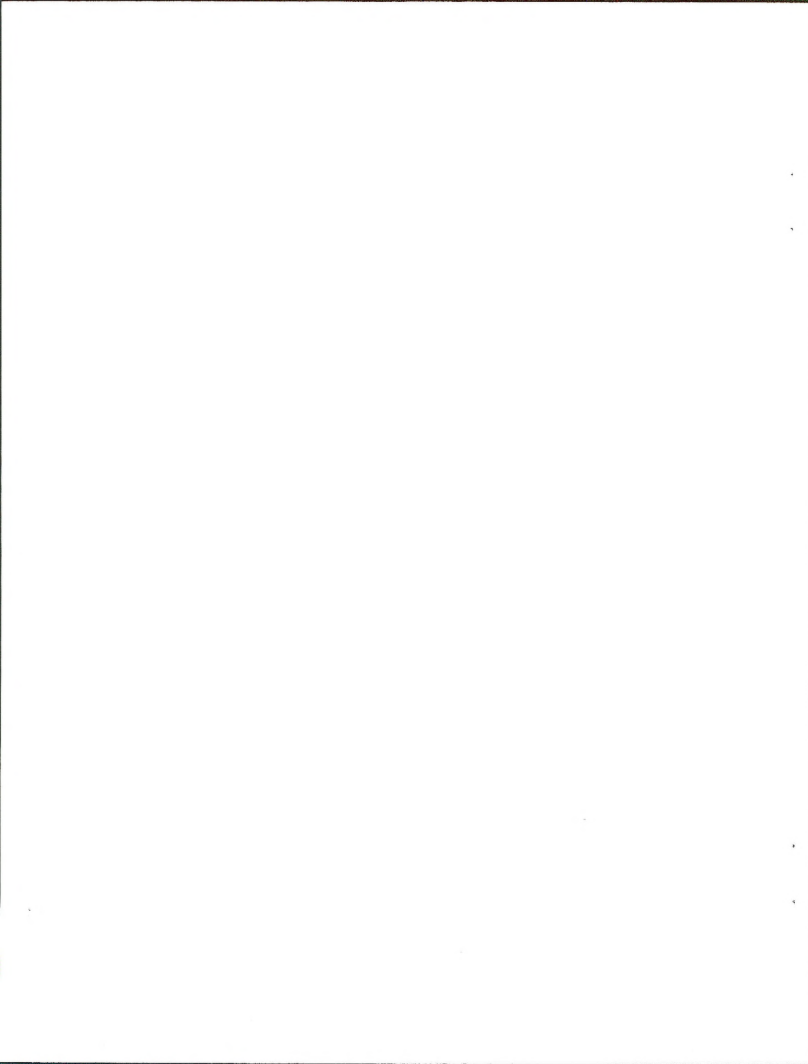
(1994), however, suggested that low beetle numbers at Bruneau Dunes State Park could be a result of encroachment on critical larval habitat by cheatgrass and Russian thistle. Finally, given the species' dependence upon active, sparsely vegetated sand dunes, the practice of dune stabilization via grass seeding also must adversely affect dune tiger beetles through reduction and fragmentation of already limited habitat. Thus, due to a variety of individual or cumulative disturbance factors, small scattered beetle populations of relatively low density, such as apparently occur in western and southcentral Idaho, may be quite vulnerable to extinction in an incremental manner over the long term.

If there is indeed cause for concern over the species' population status and trend, studies further elucidating the species' distribution as well as the degree of impacts from collecting, long-term ORV use, livestock trampling, and weed invasion of dunes are warranted, as many questions still remain unanswered. Use of Landsat, recent aerial photographs or other imagery could be used to map current sand dune distribution on a large scale as an aid in predicting potential beetle occurrences and to facilitate the planning of future beetle surveys. The collection of tiger beetles by the public is difficult to monitor and population effects of this activity on the species as a whole are currently unknown. If beetle collection is indeed a problem, measures such as restricting the collection of adult beetles to

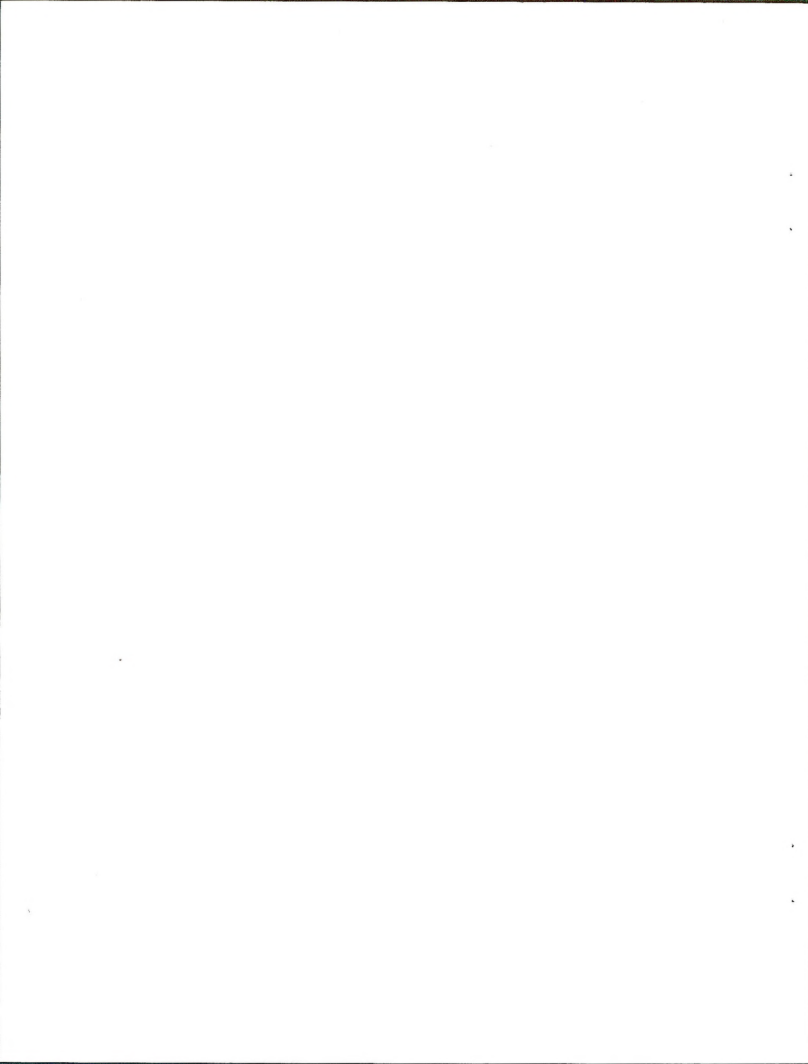


specific time-frames in order to minimize removal of breeding adults; limiting allowable numbers of beetles collected by private individuals; or closing all or specific areas to collection may be justifiable. Studies of the effects of ORV's on larvae survival suggest that young larvae, with burrows 0.25 to 1.0 inch deep are "unlikely to survive any physical disturbance at the dune surface"; but older larvae, with burrows 10-20 inches below the dune's surface are not harmed, even by considerable surface disturbance (Anderson 1989). Tighter control of ORV's may be necessary in some areas to protect younger, more susceptible larvae. Long-term studies of ORV impacts are needed, however. The current state of knowledge of livestock impacts on dunes tiger beetles is ambiguous. Bauer (1989, 1991) concluded that while livestock may negatively impact individual tiger beetle larval burrows by trampling, they may also help ensure that sand dunes remain unstable and sparsely vegetated, providing habitat for the species as a whole. The observations of Baker et al. (1994) regarding the encroachment of cheatgrass and Russian thistle on larval habitat should stimulate further research, particularly with respect to population effects on beetles, cumulative loss of suitable habitat, and acceptable weed control methods.

While the need for a formal status review of the species is perhaps debatable at present, cooperative studies between BLM,

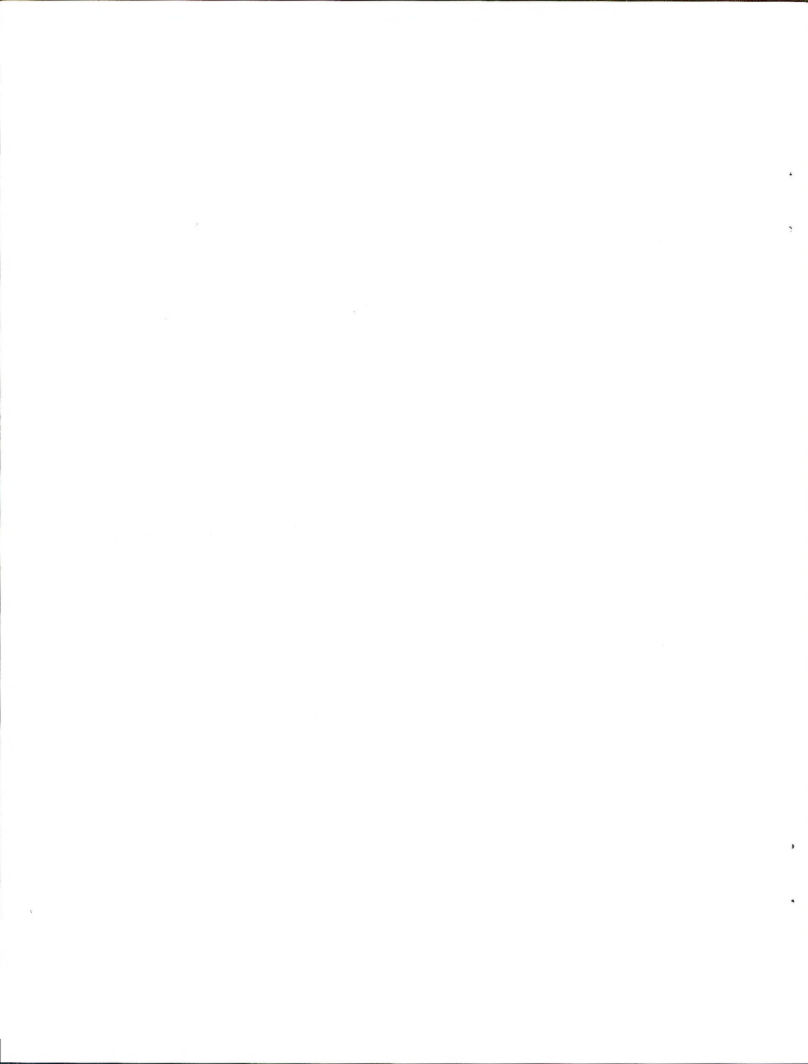


USFWS, Universities, and other entities should be continued and expanded in light of the beetle's rarity and the uncertainty associated with potential threats. Meanwhile, a conservative, ecosystem-based approach to land-use planning, which recognizes the uniqueness of dune habitats and their contribution to regional biological diversity is recommended. Minimizing sand dune stabilization or reclamation efforts in existing and potential dunes tiger beetle habitat; regulating the private collection of adult Idaho dunes tiger beetles; monitoring of weed invasions in key areas; and restricting ORV use to existing roads are suggested management actions.



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